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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,264	03/27/2007	Remy Collier	10404.043	5652
30827                      7590                      02/23/2011				
MCKENNA LONG & ALDRIDGE LLP				
1900 K STREET, NW				
WASHINGTON, DC 20006				
EXAMINER				
KRYLOVA, IRINA				
ART UNIT		PAPER NUMBER		
1764				
MAIL DATE		DELIVERY MODE		
02/23/2011		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/580,264

**Applicant(s)**

COLLIER ET AL.

**Examiner**

Irina Krylova

**Art Unit**

1764

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 November 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 6, 8 and 11-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6, 8, 11-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-940)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 23, 2010 has been entered.

### ***Response to Amendment***

2. The amendment filed by Applicant on November 23, 2010 has been fully considered. The amendment to claims 6, 15 and 18 and cancellation of claims 1-5, 7, 9-10 are acknowledged. Specifically, claim 1 has been amended to include the limitation of the hydrocarbon copolymer consisting of styrene and divinylbenzene monomers. This limitation was taken from instant specification (see p. 3, lines 19-21; p. 5, lines 14-18; p. 8, lines 13-17 of instant specification). In light of the amendment, all previous rejections and objections are withdrawn. The new grounds of rejections are set forth below.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**3. Claims 6, 8, 13-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Li et al** (US 5,760,097).

**4. Li et al** discloses a process for preparing porous crosslinked styrene-divinylbenzene (col. 2, lines 56-58) microbeads joined by interconnecting pores comprising:

- 1) combining an oil phase with an aqueous discontinuous phase to form an a high internal phase emulsion (HIPE);
- 2) polymerizing the emulsion droplets to form microbeads (Abstract);
- 3) washing the microbeads (col. 9, lines 1-5);
- 4) drying the microbeads in any conventional manner (col. 9, lines 5-10),

Wherein:

- a) the microbeads have a density of less than 0.04 g/ml (less than 40 mg/ml) and cavity size of 5-10 microns (Table 2);
- b) the oil phase comprises 15-50% of styrene; 15-50% of divinylbenzene; 4-50% of sorbitan monooleate (col. 6, lines 14-18) and a toluene as porogen and solvent for the monomers (col. 6, lines 32-45);
- c) the aqueous phase comprises 0.5-2%wt of sodium persulfate and suspending agent in distilled water (col. 6, lines 50-60; col. 7, lines 1-10; col. 20, lines 21-22; as to instant claims 13, 14);
- d) the percentage of aqueous phase is 70-98%wt (col. 5, lines 40-44).

5. All ranges in the process of **Li et al** are overlapping with the corresponding ranges in the process claimed in the instant invention. It is well settled that where the prior art describes the components of a claimed compound or compositions in concentrations within or overlapping the claimed concentrations a prima facie case of obviousness is established. See *In re Harris*, 409 F.3d 1339, 1343, 74 USPQ2d 1951, 1953 (Fed. Cir. 2005); *In re Peterson*, 315 F.3d 1325, 1329, 65 USPQ 2d 1379, 1382 (Fed. Cir. 1997); *In re Woodruff*, 919 F.2d 1575, 1578 16 USPQ2d 1934, 1936-37 (CCPA 1990); *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974).

In light of the cited patent case law, it would therefore have been obvious that in this particular instance the overlapping of the corresponding ranges in the process of **Li et al** and claimed in the instant invention establishes a prima facie case of obviousness as well.

6. Though **Li et al** discloses the use of toluene as a porogen and solvent for monomers col. 6, lines 32-40) rather than ethylbenzene as claimed in the instant invention, however, since ethylbenzene is used in the instant invention as the porogen and solvent as well (see p. 4, lines 15-18 of instant specification); and toluene and ethylbenzene are structurally related and thus, comprise similar properties, therefore, it would have been obvious to a one of ordinary skill in the art to use ethylbenzene in the process of **Li et al** as well since it would have been obvious to substitute one equivalent for another. Case law holds that the selection of a known material based on its suitability for its intended use supports prima facie obviousness. *Sinclair & Carroll Co vs. Interchemical Corp.*, 325 US 327, 65 USPQ 297 (1045). Case law holds that the

mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958).

7. Though **Li et al** does not explicitly recite the presence of electrolyte in the aqueous phase, however, since sodium persulfate comprises a an inorganic salt which in forms ions in water, therefore, it would have been obvious to a one of ordinary skill in the art that sodium persulfate may at least to some extent act as an electrolyte as well.

Though **Li et al** does not explicitly recite the drying step being conducted with the use of supercritical carbon dioxide, nevertheless, since **Li et al** recites the drying step being conducted in any conventional manner (col. 9, lines 5-10), and drying with supercritical carbon dioxide has advantage of reducing the drying time, therefore, it would have been obvious to a one of ordinary skill in the art to dry the microbeads of **Li et al** in the presence of supercritical carbon dioxide as well.

8. As to instant claim 16, the polymerization is conducted at 60°C (col. 20, lines 36-38).

9. As to instant claim 17, the microbeads are washed five times with water followed by methanol extraction (col. 22, lines 10-13).

10. As to instant claims 8 and 18, the weight ratio of styrene to DVB is 1:1 (col. 20, lines 17-19).

11. As to instant claim 15, though **Li et al** does not specify the resistivity of water, however, since **Li et al** recites the use of distilled water (col. 20, lines 21-22) and the

water produced by distillation is cited in the instant invention as having resistivity being close to 18.2 megaohms (see p. 6, lines 5-10 of instant specification), therefore, it would have been obvious to a skilled artisan that distilled water used in the process of **Li et al** will have a resistivity close to 18.2 megaohms as well. Case law holds that those portions of the specification which provide support for the patent claims may also be examined and considered when addressing the issue of whether a claim in an application defines an obvious variation of an invention claimed in the patent. In re Vogel, 422 F.2d 438, 164 USPQ 619,622 (CCPA 1970).

**12. Claims 6, 8, 11-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Li et al** (US 5,760,097) in view of **Hird et al** (US 2005/0091450), **Ko et al** (US 2003/0134918) as evidenced by **Cawiezel et al** (US 5,633,220).

13. The discussion with respect to **Li et al** (US 5,760,097) set forth in paragraphs 3-11 above is incorporated here by reference.

14. Though **Li et al** does not explicitly recite the presence of electrolyte in the aqueous phase, however,

**Hird et al** discloses a process for making a cross-linked foam by high internal phase polymerization of styrene and divinylbenzene ([0044], [0049]), wherein the organic phase comprises monomers and sorbitan monooleate ([0053]) and the aqueous phase

comprises 0.2-20%wt of trivalent inorganic sulfates as an electrolyte (as to instant claims 11-12, cited in [0059]) and sodium persulfate ([0060]).

**Hird et al** specifically teaches that electrolyte in the aqueous phase is an essential component since the dissolved electrolyte minimizes the tendency of monomers, co-monomers, and crosslinkers that are primarily water soluble to also dissolve in the aqueous phase ([0058]).

15. Thus, based on the combined teachings of **Li et al** and **Hird et al** it would have been obvious to a one of ordinary skill in the art to include an electrolyte in the aqueous phase in the process of **Li et al**, so that the presence of electrolyte will minimize the tendency of monomers, co-monomers, and crosslinkers to dissolve in the aqueous phase of the process of **Li et al** as well (see [0058] of **Hird et al**).

16. Though **Li et al** does not explicitly recite the use of ethylbenzene, however, since a) **Li et al** discloses the use of toluene as a porogen and solvent; b) ethylbenzene is used in the instant invention as the porogen and solvent as well (see p. 4, lines 15-18 of instant specification); c) toluene and ethylbenzene are structurally related and thus, comprise similar properties and d) it is known in the art that ethylbenzene is used as a solvent in internal phase water in oil emulsions (see col. 5, lines 60-65 in **Cawiezel et al**), therefore, it would have been obvious to a one of ordinary skill in the art to use ethylbenzene in the process of **Li et al** as well since it would have been obvious to substitute one equivalent for another. Case law holds that the selection of a known



material based on its suitability for its intended use supports prima facie obviousness. Sinclair & Carroll Co vs. Interchemical Corp., 325 US 327, 65 USPQ 297 (1045). Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See In re Ruff 118 USPQ 343 (CCPA 1958).

17. Though **Li et al** does not explicitly recite the drying step comprising drying with supercritical carbon dioxide, however,

**Ko et al** discloses a method for making high internal phase emulsion foam(HIPE), wherein after the polymerization reaction, the remaining components of the oil phase may be removed after polymerization by washing with a volatile organic solvent and extraction with supercritical carbon dioxide ([0044]) to produce a foam having improved fluid intake rate (see [0005]).

18. Since the microbeads of **Li et al** are used for absorption of liquids (col. 3, lines 7-10) and drying of microbeads by supercritical carbon dioxide ensures a foam having improved fluid intake rate, as taught by **Ko et al** (see [0005]), therefore, it would have been obvious to a one of ordinary skill in the art to combine the teachings of **Li et al** and **Ko et al** and to apply the step of drying with supercritical carbon dioxide in the process of **Li et al** to ensure the foam of **Li et al** having improved fluid intake as well.

**19. Claims 14-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Li et al** (US 5,760,097) view of **Sasabe et al** (US 2003/0036575), as evidenced by Lenntech/deionized water flyer.

20. The discussion with respect to **Li et al** (US 5,760,097) set forth in paragraphs 3-11 above is incorporated here by reference.

21. **Li et al** does not explicitly recite the water used in the process being ultra-pure and having resistivity of 18.2 Ohm.

22. **Sasabe et al** discloses a HIPE polymerization process of styrene and divinylbenzene monomers in the presence of sorbitan monooleate emulsifier, wherein the aqueous phase comprises sodium persulphate initiator (Abstract). The water used in the aqueous phase comprises a deionized water ([0087]).

23. Though **Sasabe et al** does not specify the resistivity of deionized water, however, it is known in the art that deionized water is a very high purity water wherein theoretically 100% of salts can be removed (see p. 1 in Lenntech/deionized water flyer). The deionized water can have a resistivity of 10-18 megaohm (see Table on p.4 of Lenntech/deionized water flyer).

24. Thus based on the combined teachings of **Li et al** and **Sasabe et al**, it would have been obvious to a one of ordinary skill in the art to use deionized water having resistivity of 18 megaohm of **Sasabe et al** in the process of **Li et al** to reduce the amount of impurities in the produced microbeads of **Li et al** as well.

**25. Claims 14-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Li et al** (US 5,760,097) in view of **Hird et al** (US 2005/0091450), **Ko et al** (US 2003/0134918) and **Sasabe et al** (US 2003/0036575), as evidenced by **Cawiezel et al** (US 5,633,220) and Lenntech/deionized water flyer.

26. The discussion with respect to **Li et al** (US 5,760,097) in view of **Hird et al** (US 2005/0091450), **Ko et al** (US 2003/0134918) set forth in paragraphs 12-18 above is incorporated here by reference.

27. **Li et al** in view of **Hird et al** and **Ko et al** do not explicitly recite the water used in the process being ultra-pure and having resistivity of 18.2 megaohm.

28. **Sasabe et al** discloses a HIPE polymerization process of styrene and divinylbenzene monomers in the presence of sorbitan monooleate emulsifier, wherein the aqueous phase comprises sodium persulphate initiator (Abstract). The water used in the aqueous phase comprises a deionized water ([0087]).

29. Though **Sasabe et al** does not specify the resistivity of deionized water, however, it is known in the art that deionized water is a very high purity water wherein theoretically 100% of salts can be removed (see p. 1 in Lenntech/deionized water flyer). The deionized water can have a resistivity of 10-18 megaohm (see Table on p.4 of Lenntech/deionized water flyer).

30. Thus based on the combined teachings of **Li et al** in view of **Hird et al** and **Ko et al** and **Sasabe et al**, it would have been obvious to a one of ordinary skill in the art to use deionized water having resistivity of 18 megaohm of **Sasabe et al** in the process of **Li et al** in view of **Hird et al** and **Ko et al** to reduce the amount of impurities in the produced microbeads of **Li et al** in view of **Hird et al** and **Ko et al** as well.

**Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Li et al** (US 5,760,097) in view of **Hird et al** (US 2005/0091450), **Ko et al** (US 2003/0134918) as evidenced by **Cawiezel et al** (US 5,633,220) and **Mork et al** (US 6,303,834).

20. The discussion with respect to **Li et al** (US 5,760,097) in view of **Hird et al** (US 2005/0091450), **Ko et al** (US 2003/0134918) as evidenced by **Cawiezel et al** (US 5,633,220) set forth in paragraphs 12-18 above is incorporated here by reference.

21. **Li et al** in view of **Hird et al** and **Ko et al** do not explicitly recite the trivalent metal sulphate salt used as an electrolyte, being an aluminum sulfate.

**22. Mork et al** discloses a process for producing an open-cell foam by HIPE polymerization of styrene, divinylbenzene, wherein the used electrolyte comprises halides and sulfates of aluminum, lithium and magnesium (col. 4, lines 13-33).

23. Thus, based on the combined teachings of **Li et al** in view of **Hird et al** and **Ko et al and Mork et al**, it would have been obvious to a skilled artisan to use aluminum sulphate as the electrolyte as well since it would have been obvious to substitute one equivalent for another used for the same purposes. Case law holds that the selection of a known material based on its suitability for its intended use supports prima facie obviousness. *Sinclair & Carroll Co vs. Interchemical Corp.*, 325 US 327, 65 USPQ 297 (1045). Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958).

### ***Response to Arguments***

24. The arguments filed by Applicant on November 10, 2010 and further filed on November 23, 2010 were previously addressed in an Advisory Action mailed on November 18, 2010. Furthermore, in light of the amendment filed by Applicant on November 23, 2010, all previous rejections are withdrawn, thus rendering Applicant's arguments moot. The new grounds of rejections are set forth above. Specifically, see discussion in paragraphs 3-23 above.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irina Krylova whose telephone number is (571)270-7349. The examiner can normally be reached on Monday-Friday 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasudevan Jagannathan can be reached on (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Irina Krylova/  
Examiner, Art Unit 1764

/Vasu Jagannathan/  
Supervisory Patent Examiner, Art Unit 1764

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